

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
16 June 2005 (16.06.2005)

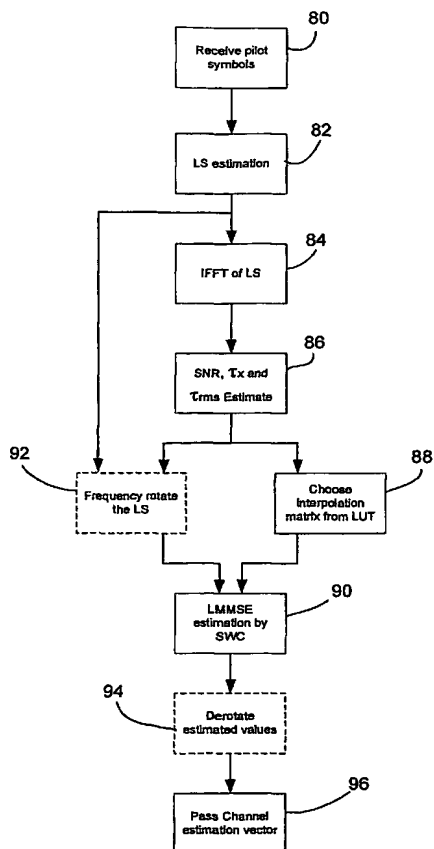
PCT

(10) International Publication Number
WO 2005/055543 A1

- (51) International Patent Classification⁷: **H04L 27/26, 25/02**
- (21) International Application Number:
PCT/AU2004/001704
- (22) International Filing Date: 3 December 2004 (03.12.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
2003906690 3 December 2003 (03.12.2003) AU
- (71) Applicant (for all designated States except US): **AUSTRALIAN TELECOMMUNICATIONS COOPERATIVE RESEARCH CENTRE** [AU/AU]; Curtin University of Technology, Building 314, Room 127, Wark Avenue, Bentley, W.A. 6012 (AU).
- (72) Inventors; and
(75) Inventors/Applicants (for US only): **FAULKNER, Michael** [AU/AU]; 7 Athol Street, Moonee Ponds, VIC 3039 (AU). **TOLOCHKO, Igor** [AU/AU]; 21/28-32 Sturdee Parade, Dee Why, NSW 2099 (AU).
- (74) Agent: **FREEHILLS PATENT & TRADE MARK ATTORNEYS**; Level 43, 101 Little Collins Street, Melbourne, VIC 3000 (AU).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: CHANNEL ESTIMATION FOR OFDM SYSTEMS



(57) Abstract: A method for performing channel estimation in an orthogonal frequency-division multiplexing system, the method including the steps of: receiving (80) transmitting pilot symbols from a plurality of transmit antennas; forming (82) a least-squares estimation matrix from the transmitted pilot symbols; forming (84-88) a sparse smoothing matrix approximating a fixed weighting matrix, wherein each row vector in the sparse smoothing matrix contains one or more of the strongest weights in each row of the fixed weighting matrix; and (90) deriving a channel estimation matrix from the sparse smoothing matrix and the least-squares estimation matrix.

WO 2005/055543 A1



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*